Carbon Cycle 2.0

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Carbon Cycle 2.0 LDRD Seminar Series is a weekly seminar series hosted by Berkeley Lab's Carbon Cycle 2.0 Iniative. Seminars are given by recipients of Laboratory Directed Research and Development (LDRD) awards related to climate and energy. These seminars are open to anyone interested in learning more about the wide variety of Carbon Cycle 2.0-themed research at Berkeley Lab.

Geologic Carbon Sequestration and Subsurface Heterogeneity Tomography

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WHEN: THURSDAY, JULY 14, 2PM - 3PM
WHERE: BUILDING 15 ROOM 253

Geologic carbon sequestration (GCS) has been investigated for more than two decades, from early concept studies in the late 1980's to field pilot tests, and to a limited number of industrial-scale applications. In order for GCS to be an effective measure for climate change mitigation, we are facing three grand challenges: the storage capacity of the subsurface is constrained by pressure buildup and its adverse effects (e.g., caprock integrity damage, induced seismicity, and fault reactivation); monitoring methods for early warning and detection of CO2 leakage need improvement; and effects of subsurface heterogeneity on CO2 migration, long-term trapping, and storage efficiency need to be better quantified. The focus of this talk will be on the last challenge.

A conceptual model is described for CO2 migration and trapping in heterogeneous formations. Laboratory and field evidence is then presented to demonstrate the effects of heterogeneity observed from centimeter-scale core flush experiments, to meter-scale laboratory experiments, to hundred meter-scale field pilot tests, and to kilometer-scale GCS application and demonstration projects. Finally, we discuss the methodology of subsurface heterogeneity tomography and its potential application to the Frio pilot test, a small scale CO2 storage experiment, which offers a wealth of diverse monitoring data of hydraulic, thermal, tracer, and CO2 injection tests.